REMARKS

The Office Action dated September 21, 2005, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1-33 are currently pending in the application, of which claims 1-3, 16-18, and 31-33 are independent claims. Claims 1-3, 15-18, and 30-33 have been amended to more particularly point out and distinctly claim the invention. No new matter has been added. Claims 1-33 are respectfully submitted for consideration.

Rejections under 35 U.S.C. 112, second paragraph

Claims 10, 15, 25, and 30 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the invention.

With regard to claims 10 and 25, the Office Action states that these claims are indefinite because the specification does not disclose or explain "a separate secondary common pilot (SCPICH) according to the WCDMA system is transmitted to each user-specific beam." Applicant respectfully submits that the claims are definite as they are written. Additionally, there is sufficient disclosure and support in the original claims, which are deemed to be part of the specification for purposes of satisfying the written description requirement. They are also supported, for example, by paragraph 0050, which states in part that "a radio channel of each user is separated from other radio channels by user-specific codes in accordance with code division multiple access

CDMA." Paragraph 0050 also states that a cell has "its own primary common pilot which is multiplied by a scrambling code in order to be transmitted to a channel." Based on the disclosure of the specification, as evidenced for example in paragraph 0050 and original claims 10 and 25, one of ordinary skill in the art would understand the metes and bounds of the claims. Accordingly claims 10 and 25 are definite. It is therefore respectfully requested that this rejection be withdrawn.

With regard to claims 15 and 30, the Office Action states that the term "perfect" in the phrase "perfect power balance" is indefinite, and suggests that the claim be "more specific in limiting." Applicant submits that "perfect power balance" is disclosed, for example, in paragraph 0050 of the specification. As explained by reference to paragraph 0053, perfect power balance refers to the sums of weight factors of two radio channels being "as equal as possible." Accordingly, "perfect" may be adequate to disclose the metes and bounds of the claims to one of ordinary skill in the art. Nevertheless, to expedite prosecution, Applicant has substituted "as equal as possible" for "a perfect power balance" in claims 15 and 30, thereby clarifying what aspect of the power balance should be perfect. No change in claim scope is intended or created by this amendment. One of ordinary skill in the art would be able to understand what it is meant by "perfect power balance" or "as equal as possible," and that therefore the claims both as previously presented and as currently amended are definite. Accordingly, it is respectfully requested that this rejection be withdrawn.

Rejections under 35 U.S.C. 103(a)

Claims 1-9, 11, 14-24, 26, and 29-33 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,005,516 of Reudink et al. ("Reudink") in view of U.S. Patent No. 5,933,466 of Oshima et al. ("Oshima"). The Office Action states that Reudink teaches all the elements of the claims, except "selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of weight factors of a radio cell formed with the antenna array and corresponding weight factors of at least one, second radio cell formed with the same antenna array are least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements." The Office Action states that Oshima remedies the deficiencies of Reudink. Applicant respectfully traverses this rejection.

Claim 1, upon which claims 4-9 and 11-15 depend, is directed to a method for determining weight factors of antenna beams. The method includes using at least one directional antenna beam implemented with an antenna array to establish a radio link. The method also includes forming a radio cell with the antenna beam. The method further includes dividing the radio cell into at least two different cells by dividing the antenna beam. The method additionally includes selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of weight factors of a radio cell formed with the antenna array and corresponding weight factors of at least one, second radio cell formed with the same antenna array are at least

substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements.

Claim 2, upon which claim 14 depends, is directed to a method for determining weight factors of antenna beams including using at least one directional antenna beam implemented with an antenna array to establish a radio link, dividing the antenna beam into at least two user-specific beams, and selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of weight factors of antenna elements of a user-specific beam and corresponding weight factors of other user-specific beams formed with the same antenna array are at least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements.

Claim 3, upon which claim 10 depends, is directed to a method for determining weight factors of antenna beams. The method includes using at least one directional antenna beam implemented with an antenna array to establish a radio link, forming a radio cell with the antenna beam, dividing the radio cell into at least two different cells by dividing the antenna beam, dividing at least one antenna beam forming a radio cell into at least two user-specific beams, and selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of corresponding weight factors of beams formed with the same antenna array are at least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements.

Claim 16 is directed to a transmitter for determining weight factors of antenna beams, in which transmitter at least one directional antenna beam implemented with an antenna array is used to establish a radio link and a radio cell is formed with the antenna beam. The transmitter includes means for dividing the radio cell into at least two cells by dividing the antenna beam, and means for selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of weight factors of a radio cell formed with the antenna array and corresponding weight factors of at least one, second radio cell formed with the same antenna array are at least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements.

Claim 17, upon which claims 19-23 depend, is directed to a transmitter for determining weight factors of antenna beams, in which transmitter at least one directional antenna beam implemented with an antenna array is used to establish a radio link. The transmitter includes means for dividing the antenna beam into at least two user-specific beams, and means for selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of weight factors of antenna elements of a user-specific beam and corresponding weight factors of other user-specific beams formed with the same antenna array are at least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements.

Claim 18, upon which claims 24-30 depend, is directed to a transmitter for determining weight factors of antenna beams, in which transmitter at least one directional

antenna beam implemented with an antenna array is used to establish a radio link and a radio cell is formed with the antenna beam. The transmitter includes means for dividing the radio cell into at least two different cells by dividing the antenna beam, means for dividing the antenna beam forming a radio cell into at least two user-specific beams, and means for selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of corresponding weight factors of beams formed with the same antenna array are at least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements.

Claim 31 is directed to a transmitter for determining weight factors of antenna beams, in which transmitter at least one directional antenna beam implemented with an antenna array is used to establish a radio link and a radio cell is formed with the antenna beam. The transmitter includes dividing means dividing the radio cell into at least two cells by dividing the antenna beam, and selecting means selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of weight factors of a radio cell formed with the antenna array and corresponding weight factors of at least one, second radio cell formed with the same antenna array are at least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements.

Claim 32 is directed to a transmitter for determining weight factors of antenna beams, in which transmitter at least one directional antenna beam implemented with an antenna array is used to establish a radio link. The transmitter includes dividing means

dividing the antenna beam into at least two user-specific beams, and selecting means selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of weight factors of antenna elements of a user-specific beam and corresponding weight factors of other user-specific beams formed with the same antenna array are at least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements.

Claim 33 is directed to a transmitter for determining weight factors of antenna beams, in which transmitter at least one directional antenna beam implemented with an antenna array is used to establish a radio link and a radio cell is formed with the antenna beam. The transmitter includes first dividing means dividing the radio cell into at least two different cells by dividing the antenna beam, second dividing means dividing the antenna beam forming a radio cell into at least two user-specific beams, and selecting means selecting weight factors of antenna elements of the antenna array such that the antenna element specific sums of corresponding weight factors of beams formed with the same antenna array are at least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements.

It is respectfully submitted that the cited art of Reudink and Oshima, whether viewed singly or in combination, fails to disclose or suggest all the elements of any of the presently pending claims.

Reudink is directed to a system for diversity among narrow antenna beams. Reudink generally describes a system in which an antenna array that provides several

antenna beams, which are diverse from each other in terms of polarization. Reudink notes that polarization differences exist between typical mobile phones (which are normally oriented at 45 degrees) and typical vehicle phones (which are normally oriented vertically). Reudink describes a system in which a receiving system uses multiple antennas to direct antenna beams. The antennas are switched on and off by using a matrix switch (as can be seen at col. 10, ll. 50-60 of Reudink). The matrix switch is also used to couple a plurality of signals to the same receiver (as can be seen at col. 11, ll. 19-24 of Reudink).

Reudink describes using a RAKE receiver in a combining or summing process. A RAKE receiver includes a plurality of receiving fingers that are each delayed in relation to each other in order to receive different multipath propagated signal components. In Reudink's described system, if a signal is strong and therefore gives more reliable detection results, more weight is assigned to that signal than to a weak one. The weights are set by using a search searcher or a scan receiver. Reudink asserts that the weighting of received signals in the process of combining provides interference reduction and gain improvement. Reudink also asserts that less complicated and more compact CDMA base stations could be built (as can be seen in col. 7, ll. 7-19 and col. 2, ll. 20-23 and 48-55).

There is nothing in Reudink, however, about selecting weight factors of antenna elements of the antenna array. Reudink simply describes that the signals received from different receiving fingers are given more or less importance in combining so as to reduce interference and improve gain.

Each of the independent claims recites "selecting weight factors of antenna elements of the antenna array ... in order to achieve a predetermined power balance between different antenna elements." Reudink does not teach at least this feature of each of the claims. The Office Action implicitly acknowledges this deficiency of Reudink in the Office Action at paragraph 2, pp. 3-4. Oshima does not remedy the deficiencies of Reudink.

The Office Action takes the position that Oshima discloses weight factors of antenna elements of the antenna array such that the antenna element specific sums of weigh factors of a radio cell formed with the antenna array and corresponding weight factors of at least one, second radio cell formed with the same antenna array are at least substantially equal within predetermined limits in order to achieve a predetermined power balance between different antenna elements. The Office Action points to col. 7, ll. 8-25 and col. 5, ll. 53-55 of Oshima. Applicant respectfully disagrees.

Oshima is directed to a radio communication apparatus with a combining diversity. Oshima generally describes a technique for improving the communication quality of a radio communication apparatus with a combining diversity by properly weighting received signals, as discussed at col. 1, ll. 65-66 of Oshima.

Oshima's delay circuits delay the carrier/noise (C/N) ratio detection signals by a predetermined amount in synchronization with a clock generated from the clock generator. The amount of delay is determined so as to erase the difference between the processing delay time required from when the digital intermediate frequency signals are

output from the reception circuit until they are supplied to the detecting circuits through the delay correction circuits and demodulated into digitally demodulated based band signals and the processing delay time required from when the C/N ratio detection signals are output from the C/N ratio detection circuits until the weight coefficients are generated. The weight coefficients are standardized such that the total sum of these coefficients always has a predetermined (constant) value (as can be seen at col. 4, ll. 25-50 and col. 5, ll. 65-67).

Oshima asserts that even when a delay in processing occurs in the detecting circuits, it can be absorbed to always weight each symbol of the demodulated baseband signals in exact timing. Thus combining diversity reception can allegedly be performed with higher precision, as explained at col. 5, ll. 11-34 of Oshima.

Demodulated based baseband signals are weighted by Oshima in multiplication circuits. Thus Oshima asserts that power consumption is lowered as explained at col. 6, ll. 28-33.

Oshima provides a weight generation circuit with delay circuits for timing correction of weighting. Oshima's purpose is to make weight coefficients coincident with the digitally demodulated baseband signals, as explained at col. 6, ll. 50-60. The weight generation circuit is also provided with standardization circuits to generate weight coefficients that are standardized such that the total sum of the weight coefficients has a preset constant value for preventing overflow in multiplication circuits, as explained at col. 7, ll. 8-15.

In short, Oshima is concerned with improving signal combining in a receiver. There is nothing in Oshima about "selecting weight factors of antenna elements of the antenna array ... in order to achieve a predetermined power balance between different antenna elements." Oshima merely discusses an option for timing correction of signal weighting, the purpose of which is to make weight coefficients coincident with the digitally demodulated baseband signals.

Applicant submits that the difference is not just that the claimed invention is intended for one purpose and that Oshima is intended for another purpose, rather Oshima provides different disclosure and does not describe "selecting weight factors of antenna elements of the antenna array ... in order to achieve a predetermined power balance between different antenna elements" because Oshima is directed toward a different purpose.

Accordingly, the combination of Reudink and Oshima fails to disclose or suggest at least the features of "selecting weight factors of antenna elements of the antenna array ... in order to achieve a predetermined power balance between different antenna elements." Thus, it is respectfully submitted that the combination of Reudink and Oshima fails to disclose or suggest all of the elements of any of the presently pending claims.

Claims 12-13 and 27-28 were rejected under 35 U.S.C. 103(a) as being obvious over Reudink in view of Oshima and in further view of U.S. Patent Application

Publication No. 2004/0029538 of Holma et al. ("Holma"). Applicant respectfully traverses this rejection.

Holma is not prior art with respect to the present application. The present application has an effective filing date of May 15, 2001. Holma may only be used as a reference as of its PCT filing date of June 1, 2001. Accordingly, the present application antedates Holma, and renders Holma inappropriate as prior art. The rejection requires Holma, as it acknowledges that the combination of Oshima and Reudink fails to teach all of the elements of the claims. Accordingly, it is respectfully requested that this rejection be withdrawn.

Conclusion

For the reasons explained above, it is respectfully submitted that each of claims 1-33 recites subject matter that is definite and neither disclosed nor suggested in the prior art of record. Accordingly, it is respectfully requested that all of claims 1-33 be allowed and that this application be passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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